

## Claims

1. A surgical instrument, comprising:
  - a shaft configured to independently transfer an actuating motion, and a rotational motion about a longitudinal axis thereof;
  - a handle portion coupled to the shaft operably configured to produce the actuating motion and the rotational motion;
  - an end effector responsive to the actuating motion; and
  - an articulation mechanism responsive to the rotational motion to articulate the end effector in a plane from the longitudinal axis of the shaft.
2. The surgical instrument of claim 1, wherein the end effector comprises a stapling and severing mechanism, wherein the actuating motion comprising a longitudinal firing motion and the stapling and severing mechanism is further responsive to a longitudinal closing motion, the handle portion and shaft configured to produce and transfer the firing and closing motions.
3. The surgical instrument of claim 2, wherein the shaft includes a closure member responsive to the longitudinal closing motion and pivotally coupled to the end effector, the shaft further includes a firing bar and a frame supporting the firing bar figured to transfer the firing motion to the end effector, the articulation mechanism including an articulation drive tube communicating the rotational motion to the pivotal coupling of the end effector.
4. The surgical instrument of claim 3, wherein the pivot coupling comprises a pair of distally projecting, laterally opposed posts extending from the closure member respectively coupled to a pair of proximally projecting, laterally opposed pivot points extending from the end effector.
5. The surgical instrument of claim 3, wherein the articulation mechanism comprises:
  - a means for pivotally coupling the end effector to the shaft;
  - a gear means for converting the rotational motion of the articulating drive tube to an articulation motion of the end effector.

6. The surgical instrument of claim 1, wherein the shaft further comprises an articulation drive tube responsive to the rotational motion from the handle portion and distally terminating in a gear section, the articulation mechanism comprising a spur gear proximally attached to the end effector and engaged by the gear section.
7. The surgical instrument of claim 6, wherein the articulation drive tube further comprises a second gear section proximally recessed with respect to the first gear section, the end effector further comprises a proximally projecting gear section laterally opposite the spur gear, the surgical instrument further comprising a reversing gear engaged  
5 between the second gear section and the proximally projecting gear section.
8. The surgical instrument of claim 6, wherein the gear section and the spur gear form a bevel gear connection.
9. The surgical instrument of claim 6, wherein the shaft further comprises an articulation drive tube communicating the rotational motion to the articulation mechanism, the articulation mechanism comprises a spur gear proximally attached to the end effector, centered on the longitudinal axis of the shaft, the articulation mechanism  
5 including slanted teeth converging on each side of the spur gear.
10. The surgical instrument of claim 6, wherein the shaft further includes a counter rotating rod offset from the longitudinal axis and the rotating rod, the counter rotating rod and rotating rod enmeshed to opposite sides of the cylindrical gear.
11. The surgical instrument of claim 10, wherein the cylindrical gear has a concave face.

12. A surgical instrument, comprising:  
a handle portion operably configured to produce a rotational motion;  
a shaft having a longitudinal axis and comprising:  
an elongate frame attached to the handle portion,  
5 an articulation drive tube encompassing the elongate frame and responsive to the  
rotational motion, and  
a gear section distally projecting about at least a portion of a circumference of a  
distal end of the articulation drive tube;  
an end effector pivotally coupled to the shaft at a pivot axis; and  
10 a spur gear on the pivot axis, proximally attached to the end effector and engaged to  
the gear section to convert the rotational motion of the articulation drive tube to an  
articulation motion pivoting the end effector from the longitudinal axis of the  
shaft.

13. The surgical instrument of claim 12, wherein the articulation drive tube further  
comprises a second gear section proximally recessed with respect to the first gear section,  
the end effector further comprises a proximally projecting gear section laterally opposite  
the spur gear, the surgical instrument further comprising a reversing gear engaged  
5 between the second gear section and the proximally projecting gear section.

14. The surgical instrument of claim 12, wherein the spur gear is centered on a  
longitudinal axis of the end effector, the gear section of the articulation drive tube  
comprising slanted gear teeth converging on each lateral side of the spur gear.

15. The surgical instrument of claim 12, wherein the gear section of the articulation  
drive tube comprises a beveled gear section, and the spur gear comprising a beveled spur  
gear.

16. The surgical instrument of claim 12, wherein the articulation drive tube further  
comprises a second gear section proximally recessed with respect to the first gear section,  
the end effector further comprises a proximally projecting gear section laterally opposite  
the spur gear, the surgical instrument further comprising a reversing gear engaged  
5 between the second gear section and the proximally projecting gear section.

17. A surgical instrument, comprising:  
a handle portion operably configured to produce a rotational motion;  
a shaft having a longitudinal axis and comprising:  
an elongate frame attached to the handle portion and  
5 an articulation drive tube offset from the longitudinal axis of the shaft, responsive  
to the rotational motion, and including a distal, exterior threaded portion;  
an end effector distally and pivotally coupled to the frame at a pivot axis; and  
a gear connection offset from the pivot axis and the longitudinal axis of the shaft and  
engaged with the distal, exterior threaded portion of the articulation drive tube to  
10 convert the rotational motion of the articulation drive tube to an articulation  
motion pivoting the end effector from the longitudinal axis of the shaft
18. The surgical instrument of claim 17, wherein the gear connection comprises a spur  
gear aligned with the pivot axis having a gear face offset from the pivot axis and aligned  
with the articulation drive tube.
19. The surgical instrument of claim 17, wherein the gear connection comprises a spur  
gear aligned with the pivot axis having a gear face offset from the pivot axis and aligned  
with the articulation drive tube forming a worm gear connection.
20. The surgical instrument of claim 19, wherein the gear connection further  
comprises a second articulation drive tube engaging an opposite side of the gear face.
21. The surgical instrument of claim 19, wherein the spur gear includes a concave  
gear face.
22. The surgical instrument of claim 17, further comprising a resilient member  
coupling the frame to the end effector, and a second articulation drive tube offset from the  
longitudinal axis opposite to the first articulation drive tube and both distally passing  
through the resilient member to respective threaded connections.